

PATENT

Attorney Docket No.: 033082 M 177

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Confirmation No.: 3772

In re Patent Application of : Jun Takeuchi, et al.
U.S. Serial No. : 10/663,793
Filed : September 17, 2003
Examiner : Katherine A. Bareford
Group Art Unit : 1762
For : METHOD FOR COATING INTERNAL MEMBER
HAVING HOLES IN VACUUM PROCESSING
APPARATUS AND THE INTERNAL MEMBER
HAVING HOLES COATED BY USING THE
COATING METHOD

REPLY BRIEF

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Sir:

(1) Real Party In Interest

The present application is assigned to Tokyo Electron Limited, a corporation of Japan having a place of business at 3-6, Akasaka 5-chome, Minato-Ku, Tokyo-To, JAPAN.

(2) Related Appeals and Interferences

Appellant and the Examiner agree that there are no related appeals, interferences or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status Of Claims

Claims 1-4 remain pending in the application, and are under appeal. These claims are attached to this Reply Brief, in the same way they were attached to Appellant's Brief in accordance with 37 CFR 1.192(c)(9). Claims 5-8 were withdrawn as being directed to a non-elected species.

(4) Status of Amendments After Final

The Examiner and Appellant agree that no amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The Examiner and Appellant agree that Appellant's summary of claimed subject matter in Appellant's brief is correct.

(6) Grounds Of Rejection To Be Reviewed On Appeal

The following issues remain presented for consideration in this appeal:

- 1) Whether claim 1 is unpatentable under 35 U.S.C. §103(a) as being unpatentable in view of the “admitted state of the prior art” (pages 1-4 of the specification) taken with U.S. Patent Application Publication No. 2003/0154919 to Rice et al. (“Rice”) and Japan 05-278038 (“JP ‘038”); and
- 2) Whether claims 2-4 are unpatentable under 35 U.S.C. §103(a) as being unpatentable in view of the “admitted prior art” taken with Rice, Japan 05-278308 (‘038) and further taken with WO 01/54188 (“WO ‘188”), U.S. Patent No. 4,115,507 to Pico, deceased, et al. (“Pico”) and U.S. Patent No. 5,634,266 to Sherstinsky et al. (“Sherstinsky”).

(7) Claims Appendix

The Examiner and Appellant agree that the copy of the appealed claims contained in the Appendix (7) to Appellant’s brief and this Reply Brief is correct.

(8) Evidence Relied Upon

The Examiner and Appellant agree on the list of evidence relied upon.

ARGUMENT

(9) Grounds of Rejection

A. In regard to the Examiner's argument that claim 1 is unpatentable in view of the "admitted state of the prior art" in view of Rice et al and JP '308, Appellant respectfully disagrees.

In the Examiner's Answer of April 4, 2008, beginning at page 4, the Examiner continues to take the position that the admitted state of the prior art teaches all the features of claim 1 "except the use of the metal padding plug coated with a metal-resin composite layer as claimed, so that the plugs have a core of metal and a metal-resin composite layer covering the core member being a complex consisting of a metal material and a resinous material exhibiting nonconjugative property to the coating film, as in step (A), and removing the padding plugs after coating (step C)." The Examiner is substantially silent about step (B) (forming a ceramic coating film on the surface of the internal member of step (A) by means of plasma spraying, especially read in conjunction with step (A). The Examiner describes the problem of the admitted prior art at page 4: "padding plugs of metal . . . suffer from the problem of the coating material conjugating to the metal material of the padding plugs, with removal of the plugs being a problem because they are welded to the coating film."

The Examiner takes the position at page 5 that Rice's cup 62 of masking apparatus (Figure 4B and paragraphs [0002], [0035], [0040]-[0041] and [0044]) solves the problem of the admitted prior art in combination with the teachings of '038 which teaches a desirable mold release coating. Applicants respectfully disagree on the grounds that one of ordinary skill in the art would not look to the teachings of Rice to solve the problem of the admitted prior art for several reasons:

1) Rice does not provide a method for coating an internal member in a vacuum processing apparatus, the internal member having holes coated by using the coating method, that is, one of ordinary skill in the art would not look to the masking apparatus depicted in Rice, Fig 4B, for solving the problem of the admitted prior art.

2) Rice teaches a deformable masking cup 62 (Abstract) made, for example, of thin sheet metal, used in a differently structured apparatus for a different purpose. Thus, Rice does not have padding plugs as recited.

3) Rice does not have holes as recited.

4) Rice does not suffer the operating conditions of the present apparatus such as high kinetic energy in plasma spraying as used in the present apparatus.

5) Rice's deformable cup of thin sheet metal cannot be practically substituted for a padding plug of metal for filling holes of an internal member as recited.

For at least these reasons, one of ordinary skill in the art would not look to the masking apparatus depicted in Rice, Fig 4B, for solving the problem of the admitted prior art. To do so would permit the Examiner to use impermissible hindsight.

The '038 does not change this. The '038 disclosure is cited for teaching "a desirable mold release coating for a die made of a material such as steel" (page 5). However, Rice's deformable cup 62 is not a steel die. Consequently, the problem of the prior art is not solved by Rice or JP '038. One would not look to Rice's cup 62 for a solution to a padding plug problem or to JP '038 for coating padding plugs or holes. This is clearly a further instance of the Examiner's use of impermissible hindsight to reconstruct applicant's claim 1.

Further, claim 1 on appeal recites per step A "filling the holes of the internal member with padding plugs each of which has a core member made from a metal material and a *metal-resin composite layer* covering the circumferential surface of the core member, the metal-resin composite layer being a complex consisting of a metal material and a *resinous material exhibiting nonconjugative property to the coating film*," (our emphasis added). Step B requires "forming a ceramic coating film on the surface of the internal member by means of plasma spraying after the step (A)." Applicants have already urged the difficulty of combining steps (A) and (B) – the inherent involvement of high kinetic energy in plasma spraying not found in Rice or '038. Applicants urge that "protection" is at cross purposes to "demolding" as taught by '038. The Examiner appears to be silent about these arguments of Appellant.

Further still, claim 1 requires that the padding plug's "metal-resin composite layer" be a complex "exhibiting non-conjugative property to the coating." At page 3, lines 23-31 in the specification, Applicants discuss the failure of conventional methods to preclude conjugation between metal padding plugs and ceramic spray. They observed:

[i]f the padding plugs are made of a metal material, they are not molten by heat of plasma spraying. However, it is noted that coating material conjugates to the metal material of the padding plugs disadvantageously. Even if it is desired to extract the padding plugs after the coating process, they could not be extracted with ease since they are welded to the coating film. High-handed extraction would cause the coating film to be peeled or cracked.

In their specification, they give the specific example of how a ceramic coating film such as Al_2O_3 (see, e.g., page 2, line 8), conjugates to metal padding plugs disadvantageously. Their claim 1 thus limits their metal-resin composite layer to a complex consisting of a metal material and a resinous material exhibiting non-conjugative property to the ceramic coating film.

The admitted prior art and JP '038 do not teach applying a ceramic coating film onto the PTFE-containing Ni-P plating disposed on the metallic mold. Rather, JP '038 teaches that the PTFE-containing Ni-P plating improves the releasability of a rubber product formed in the mold. Thus, JP '038 teaches only that the PTFE-containing Ni-P plating is non-conjugative relative to rubber, not relative to ceramic material. As such, JP '038 could not have taught or suggested, to one of ordinary skill in the art, the use of a plating that is assured to be non-conjugative relative to a ceramic coating.

Rice teaches that cup 62 is made from

a resilient, compressible or compliant material such as thin sheet metal including aluminum or steel, a polymer such as silicone or a Santoprene® synthetic elastomer from Monsanto Co., a composite material such as a reinforced polymer or a composite aluminum foil laminated to a fiberglass cloth or another polymer.

Alternatively, any material that returns to its original shape after being deformed or squeezed by fingers 98 and can withstand the temperature of the droplets from thermal spray device 40 is believed suitable for practicing the invention. (paragraph [0040]).

One of even “ordinary creativity” or using “common sense,” as per our recent Supreme Court decision re obviousness in *KSR v. Teleflex* would not be led to perform the combination of steps (A) and (B).

Claim 1 cannot be read in piece part. Rather, for example, the recited steps (A) and (B) must be read together and considered together. The Examiner has not made a *prima facie* case of obviousness. There are clearly differences between the applied prior art and the claimed invention of claim 1. The applied prior art of record is inoperable for the task at hand of solving the admitted problem of the admitted prior art. There must be some reason to combine the admitted state of the art with Rice and ‘038. The Examiner has not clearly stated such a reason. To the contrary, Appellant has enumerated above the several difficulties with the Examiner’s applying the applied prior art. Simply stated, one of ordinary skill in the art would not recognize cup 62 as a padding plug suitable “for filling the holes of the internal member” (disposed in a vacuum processing apparatus). There is one Rice cup, not a plurality of plugs for filling holes. The Examiner is using improper hindsight to reform cup 62 as a padding plug. ‘038 fails to make up for the deficiencies of Rice and is likewise not related to padding plugs used in plasma spraying.

B. In regard to the Examiner’s argument that claims 2-4 are unpatentable in view of the “admitted state of the prior art” in view of Rice et al and JP ‘038 as applied to claim 1 above, and further in view of Pico (the ‘188 translation) and Sherstinsky, Appellant respectfully disagrees.

In her rejection of claims 2-4, the Examiner relies on the ‘188 translation at page 7 and the “Practical Example 1” at pps. 14-15 of the translation, in addition to her analysis of the ‘038 translation. The examiner provides a lengthy, conclusory discussion of how one of ordinary skill in the art would combine Rice, the ‘038 translation, the ‘188 translation, Pico and Sherstinsky (a total of five references in addition to the admitted art) in order to achieve certain objectives that none of the references alone could achieve. Applicants have already urged the Examiner’s use of improper hindsight in traversing the rejection of claim 1. It is improper hindsight in the extreme

to make the five reference combination rejection, in view of admitted art, of dependent claims 2-4. The Examiner must state a reason to support making such a combination.

Claim 2 depends from claim 1 and further recites such details as the hole inner diameter from .3 mm to 5.0 mm, the steel wire core member, the thickness of the electroless plating layer having fluoropolymer particles of 10 to 50 microns, the coating film composition and the projection of padding plugs of 1 to 3 mm. Such particular detail is not disclosed or suggested by the prior art references, especially when dependent claim 2 is read in combination with claim 1. The Examiner is silent about many of these features or makes unpersuasive arguments. For example, the Examiner alleges at page 7, and then at page 10 in greater detail, that a disclosure of steel by Rice or '038, in combination with Sherstinsky teaching a .5mm hole, is also a disclosure or suggestion of the recited "steel wire core member." Clearly, a "hole" is not a disclosure or suggestion of wire, let alone, its composition.

Another example is the Examiner's position that the '038 teaching a greater than 1 micron PTFE particle suggests a 10 – 50 micron thick plating layer as recited. Claim 4/3/1 is similar to claim 2 in providing specific detail. Consequently, in Appellant's view, the Examiner has not made a *prima facie* case of obviousness in rejecting claims 2 or 4.

Claim 3 depends from claim 1 and adds further steps (D), (E) and (F). At Page 7 of her Answer, the Examiner admits that the admitted state of the prior art in view of Rice and '038 do not teach "the multiple layers (to provide electrode layer embedded in insulating layer) (claim 3)." The Examiner makes conclusory statements about the additional steps (D), (E) and (F) at pages 8 and 9. Rice, '038 and '188 relied upon by the Examiner are deficient for teaching or suggesting these steps, especially when considered with steps (A), (B) and (C) of claim 1 on which claim 3 depends.

Thus, for at least the foregoing reasons and the reasons set forth in the Appeal Brief, Appellant respectfully submits that the five reference combination does not render claims 2-4 obvious.

(10) Response to Argument

A. In regard to the Examiner's response to Appellant's argument that claim 1 is unpatentable in view of the "admitted state of the prior art" in view of Rice et al and JP '308, Appellant respectfully disagrees.

First, the Examiner admits at page 12 that "Rice only specifically mentions the term "ceramic" in regard to the general thermal spray coating features in paragraph [0002] as well known thermal spray material." Rice has a cup, not one of a plurality of padding plugs for filling holes. What is suitable for Rice's cup may not and, in fact, is not suitable for a padding plug as recited. The Examiner admits that "cup 62 of Rice is not a padding plug." The Examiner then attempts to urge its functional ability, for example, that it "protects certain areas of the crankcase." This is not a suggestion by Rice to use Rice's cup as one of a plurality of padding plugs as recited. Moreover, the Examiner speculates about Rice's masking cup: "will get a significant exposure to the spray from the thermal spray gun." This is conjecture and not supported by Rice itself. This allegation that the cup will get a significant exposure is not supported by the evidence. It is not a reason to use a cup as a padding plug "for filling the holes of the internal member (of a vacuum processing apparatus)" as recited. This is continued improper hindsight.

Second, the Examiner provides a definition of non-conjugative at page 17 where "conjugative" means "join together" and a non-conjugative coating "does not stick, adhere or join with so that the thermal spray coating does not stick to the plugs." This definition is untenable because the Examiner has ignored the words of the specification at page 13, line 35 to page 14, line 7:

The non-conjugative property to the coating film means that the coating film could be separated from the resinous material even if the former was stuck to the latter. As the material having such non-conjugative property, it is general that hard-wettable, low frictional, well slippery and non-sticking material is preferable. In detail, there are recommended fluorocarbon resin, polyimide resin, polyamide-imide resin, etc.

The Examiner's definition should not be permitted to prevail over Applicants' definition. Applicants may be their own lexicographer.

Third, the Examiner admits at page 13 of her Answer that "'038 is not concerned with mold release coatings for masking plugs used in thermal spraying" and urges its relevance, again, with improper hindsight of applicants' claim 1. The examiner suggests that one should look to the broad field of mold release coatings generally. The Examiner defines the field far too broadly to provide a reason, required by *KSR v. Teleflex* for utilizing the teachings of the '038 disclosure to supplement the teachings of Rice.

Hence, Appellant respectfully traverses the arguments that are made beginning at page 11. The Board should not permit the Examiner to define the state of the art so broadly without providing a reason to combine, should not permit consideration of arguments following the Examiner's definition of non-conjugative for the reason that the Examiner should not be permitted to rely on her own definition for making a Rice and '038 disclosure combination and should not permit the Examiner to fail to provide a reason to combine the Rice and '038 disclosure references as required by *KSR v. Teleflex*.

B. In regard to the Examiner's response to applicants' argument that claims 2-4 is unpatentable in view of the "admitted state of the prior art" in view of Rice et al and JP '038 further in view of Pico, deceased et al., and Sherstinsky, Appellant respectfully disagrees.

The Examiner simply states that no further arguments have been made by Appellant and maintains her rejection. For the reasons stated in Appellant's ARGUMENT Section (9) B. (above), the Examiner has failed to state a *prima facie* obviousness rejection of claims 2-4 using the five reference combination (including the admitted prior art) as alleged. The Examiner's rejection of claims 2-4 should be reversed.

* * * * *

For the reasons set forth above and in the Appeal Brief, Appellant respectfully requests that the rejections under 35 U.S.C. §103(a) be reversed.

If any fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033082M177.

Respectfully submitted,
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CLAIMS APPENDIX

Pursuant to 37 CFR 1.192(c)(9), herein is a clean copy of claims 1-4, the claims involved in this appeal.

Claim 1 (Previously Presented): A coating method for forming a coating film of ceramic material on a surface of an internal member disposed in a vacuum processing apparatus, the internal member having holes formed on the surface, the method comprising:

a step (A) of filling the holes of the internal member with padding plugs each of which has a core member made from a metal material and a metal-resin composite layer covering the circumferential surface of the core member, the metal-resin composite layer being a complex consisting of a metal material and a resinous material exhibiting nonconjugative property to the coating film;

a step (B) of forming a ceramic coating film on the surface of the internal member by means of plasma spraying after the step (A); and

a step (C) of extracting the padding plugs out of the holes of the internal member after the step (B).

Claim 2 (Original): A coating method according to claim 1, wherein the surface of the internal member having holes is composed of a material selected from a group of aluminum and aluminum base alloys; each of the holes has an inner diameter ranging from 0.3 mm to 5.0 mm; the core member of the padding plug is formed by a steel wire; the metal-resin composite layer of the padding plug is composed of an electroless nickel plating layer ranging from 10 to 50 μm in thickness and having fluoropolymer particles dispersed therein; the coating film is composed of a material selected from a group of Al_2O_3 , AlN , TiO_2 and Y_2O_3 ; and at the step (A), the padding plugs are fitted in the holes so as to project from the surface of the internal member by 1 mm to 3 mm.

Claim 3 (Previously Presented): A coating method for forming a first coating film providing an insulating layer and a second coating film providing an electrode layer embedded in the insulating layer on a base part of an electrostatic chuck as an internal member disposed in a

vacuum processing apparatus and having gas injection holes formed on the surface thereof, the method comprising:

a step (D) of forming a first insulating layer composed of a coating film of Al_2O_3 on the surface of the base part of the electrostatic chuck by using the coating method as defined in claim 1;

a step (E) including: a series of: a process (a) of filling the gas injection holes of the base part with padding plugs made of a metal material; a process (b) of forming a tungsten coating film on the surface of the first insulating layer by means of plasma spraying after the process (a); and a process (c) of extracting the padding plugs out of the gas injection holes of the base part of the electrostatic chuck after the process (b); and forming the electrode layer arranged on the first insulating layer; and

a step (F) of forming a second insulating layer composed of a coating film of Al_2O_3 on the surface of the electrode layer by using the coating method as defined in claim 1.

Claim 4 (Original): A coating method according to claim 3, wherein the surface of the internal member having holes is composed of a material selected from a group of aluminum and aluminum base alloys; each of the holes has an inner diameter ranging from 0.3 mm to 5.0 mm; the core member of the padding plug is formed by a steel wire; the metal-resin composite layer of the padding plug is composed of an electroless nickel plating layer ranging from 10 to 50 μm in thickness and having fluoropolymer particles dispersed therein; the coating film is composed of a material selected from a group of Al_2O_3 , AlN , TiO_2 and Y_2O_3 ; and at the step (A), the padding plugs are fitted in the holes so as to project from the surface of the internal member by 1 mm to 3 mm.